

What is claimed is:

1. A power transmission apparatus for use in an automobile, comprising:

(a) an engine;

5 a gear-type transmission having: (b1) a first input shaft to which motive power is transmitted from said engine through a first friction clutch; (b2) a second input shaft to which motive power is transmitted from said engine through a second friction clutch; (b3) plural numbers of gear trains provided between said
10 first input shaft and an output shaft and between said second input shaft and said output shaft; and (b4) a claw clutch provided on said gear trains;

(c) a first motor connected to said first input shaft;
and

15 (d) a second motor connected to said second input shaft,
wherein,

either one of said first motor and said second motor is driven so that reduction of torque on said output shaft is compensated, when conducting gear-shift through change-over of
20 said gear trains by means of said claw clutch.

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2. A power transmission apparatus for use in an automobile,
comprising:

(a) an engine;

5 a gear-type transmission having: (b1) a first input shaft
to which motive power is transmitted from said engine through
a first friction clutch; (b2) a second input shaft to which motive
power is transmitted from said engine through a second friction
clutch; (b3) plural numbers of gear trains provided between said
10 first input shaft and an output shaft and between said second
input shaft and said output shaft; and (b4) a claw clutch provided
on said gear trains;

(c) a first motor connected to said first input shaft;
and

15 (d) a second motor connected to said second input shaft,
wherein,

either one of said first motor and said second motor is
driven so that torque fluctuation on said output shaft is
suppressed, when conducting gear-shift through change-over
between said first friction clutch and said second friction
20 clutch.

3. A power transmission apparatus, as described in either
one of the claims 1 and 2, wherein either one of said first motor

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or said second motor is driven so that wear-out of said claw clutch is suppressed by controlling either one of said first input shaft and said second input shaft, when conducting gear-shift through change-over of said gear trains by means of
5 said claw clutch.

4. A power transmission apparatus for use in an automobile, comprising:

(a) an engine;

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10 a gear-type transmission having: (b1) a first input shaft to which motive power is transmitted from said engine through a first friction clutch; (b2) a second input shaft to which motive power is transmitted from said engine through a second friction clutch; (b3) plural numbers of gear trains provided between said first input shaft and an output shaft and between said second
15 input shaft and said output shaft; and (b4) a claw clutch provided on said gear trains;

(c) a first motor connected to said first input shaft;

(d) a second motor connected to said second input shaft;

and

20 (e) a battery being charged with an output generated either one of said first motor and said second motor, wherein,

either one of said first motor and said second motor is driven with an output discharged from said battery, for traveling.

5 5. A power transmission apparatus for use in an automobile, comprising:

(a) an engine;

10 a gear-type transmission having: (b1) a first input shaft to which motive power is transmitted from said engine through a first friction clutch; (b2) a second input shaft to which motive power is transmitted from said engine through a second friction clutch; (b3) plural numbers of gear trains provided between said first input shaft and an output shaft and between said second input shaft and said output shaft; and (b4) a claw clutch provided on said gear trains;

15 (c) a first motor connected to said first input shaft;

(d) a second motor connected to said second input shaft;
and

(e) a battery being charged with an output generated either one of said first motor and said second motor, wherein,

20 electric power generation is conducted through driving either one of said first motor or said second motor by a part

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of motive power of said engine, so as to charge said battery with generated output obtained by the electric power generation, during traveling with driving power of said engine.

6. A power transmission apparatus for use in an automobile,
5 comprising:

(a) an engine;

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10 a gear-type transmission having: (b1) a first input shaft to which motive power is transmitted from said engine through a first friction clutch; (b2) a second input shaft to which motive power is transmitted from said engine through a second friction clutch; (b3) plural numbers of gear trains provided between said first input shaft and an output shaft and between said second input shaft and said output shaft; and (b4) a claw clutch provided on said gear trains;

15 (c) a first motor connected to said first input shaft;

(d) a second motor connected to said second input shaft;
and

(e) a battery being charged with an output generated either one of said first motor and said second motor, wherein,

20 either one of said first motor and said second motor is driven by said engine so as to conduct electric power generation,

when a vehicle stops and if remaining capacity of said battery is less than a predetermined value, thereby charging said battery with generated output obtained through the electric power generation.

5 7. A power transmission apparatus for use in an automobile, comprising:

(a) an engine;

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10 a gear-type transmission having: (b1) a first input shaft to which motive power is transmitted from said engine through a first friction clutch; (b2) a second input shaft to which motive power is transmitted from said engine through a second friction clutch; (b3) plural numbers of gear trains provided between said first input shaft and an output shaft and between said second input shaft and said output shaft; and (b4) a claw clutch provided
15 on said gear trains;

(c) a first motor connected to said first input shaft;
and

(d) a second motor connected to said second input shaft,
wherein,

20 either one of said first motor and said second motor is driven by said engine, so as to conduct electric power generation, while the other is driven with generated output obtained through

the electric power generation, thereby to travel.

8. A power transmission apparatus for use in an automobile, comprising:

(a) an engine;

5 a gear-type transmission having: (b1) a first input shaft to which motive power is transmitted from said engine through a first friction clutch; (b2) a second input shaft to which motive power is transmitted from said engine through a second friction clutch; (b3) plural numbers of gear trains provided between said
10 first input shaft and an output shaft and between said second input shaft and said output shaft; and (b4) a claw clutch provided on said gear trains;

(c) a first motor connected to said first input shaft;

(d) a second motor connected to said second input shaft;

15 and

(e) a battery being charged with an output generated either one of said first motor and said second motor, wherein,

either one of said first motor and said second motor is driven with an output discharged from said battery, thereby to
20 assist driving power of said engine.

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